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SCIENCE NEWS LETTER

OCT 18 1932

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

OCTOBER 15, 1932

The Saber-Tooth Strikes

See Page 242

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXII *No. 601*

The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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? DO YOU KNOW THAT ?

Japan has opened its first agricultural museum.

The steel industry has developed 1,600 kinds of alloy steel.

A French technical journal announces the manufacture of soap from locusts.

In poisoning their arrows, the Gauls are said to have used the poisonous roots of aconite.

A new product similar to celluloid and made of wood pulp has been developed in Norway.

The standard diet of chickens is deficient in iron and results in many anemic fowls, is the view of a poultry specialist at the University of California.

The Atlantic shore line of North America has moved back and forth, in the course of time, over an area 250 miles wide.

The beautiful, spectacular scenery of the Painted Desert has been added to the Petrified Forest National Monument in Arizona.

A new material resembling suede is being turned out in 24 colors.

Large deposits of copper have been discovered in Bashkir Republic in the Soviet Union.

By chemically treating the water used in locomotive boilers so as to prevent corrosion and rust, the saving to one railroad alone is $1,000,000 a year.

The U. S. Department of Agriculture reports that 190 county-wide cooperative campaigns against rats are scheduled for this autumn in states east of the Mississippi.

The University of Hawaii holds one of its extension course schools on the rim of a volcano, so that the students can study the botany, geology, and volcanic phenomena.

A forestry professor at Cornell tells how to distinguish real mahogany: An examination of the wood through a simple hand lens or reading glass will show a very dark reddish-brown gum visible in the pores of true mahogany, and lines of soft tissue which are light colored and conspicuous.

WITH THE SCIENCES THIS WEEK

Curiosity arousing questions for the teacher and general reader. Book references in italic type are not sources of information of the articles, but are references for further reading. Books cited can be supplied by Librarian, Science Service, at publisher's price, prepaid in U. S.

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BOTANY

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METEOROLOGY

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PHYSICS

Is there a positive electron? p. 249. *The Atom—G. P. Thomson—New York, Holt*, 1930, $1.25.

What proposal may make subatomic physics more understandable? p. 244.

PSYCHIATRY

During what years was the recent increase in suicides most pronounced? p. 240.

Why have admissions to Federal hospitals for mental diseases increased while there has been no increase in these diseases throughout the country? p. 244.

PUBLIC HEALTH

How large are the smallest dust grains that damage the lungs? p. 239.

What forms of cancer are most likely to be fatal? p. 240. *Cancer—Albert Soiland—New York, Appleton*, 1928, $1.50.

Who is Dr. R. E. Dyer? p. 245.

PUBLIC HEALTH

Dangers of Dust in Industry Described at Safety Congress

Foods Were Exploded and Counts Given of Millions of Particles Per Cubic Foot of Air Breathed by Workers

DUST HAD an important place on the program of the National Safety Council which met in Washington.

The explosive possibilities of the dusts of foods were demonstrated with a convincing bang, and results of studies of dusty atmospheres in which men must work were given, so that their health may be better protected.

Corn starch, baking powder, powdered milk and other grocery store goods are harmless enough once they land on the shelf. But back in the factory where these foods are prepared, the air may grow heavy with particles of dust from the food products. And, in those circumstances, certain food dusts are highly explosive, government engineers have discovered.

Dr. David J. Price, principal engineer of the Chemical Engineering Division, Department of Agriculture, planned twelve experimental explosions to show how dust explosions occur, how to fight them, and, what is most important, how to take protective steps in advance against them.

The experiments were staged at the government testing station, where the engineers have built a miniature factory which reproduces actual conditions. Dr. Price demonstrated how factories can be protected against structural damage by the placing of properly proportioned vents. These vents release dust explosion pressures.

Besides a number of food dusts, explosions of soap powder, cork dust, and wood dust were set off for the congress.

Dusty Trades Studied

A report on the dust content of the air in talc mines, coal mines, granite quarries, and various other dusty trades was presented by Dr. J. J. Bloomfield of the U. S. Public Health Service, who not only summed up the findings of his own research, but recalled to the Council the work of other investigators on this dust hazard problem.

It has long been recognized that workers who breathe some kinds of dust, day after day, are exceptionally prone to develop a lung condition known as fibrosis. Tuberculosis is sometimes associated with this condition.

Scientists have been working to find out how much dust and what kinds constitute this health hazard.

Dr. Bloomfield told of measuring dust grains as small as one fifty-thousandth of an inch in diameter. Grains smaller than that, he reported, are negligible in damaging the lungs.

2,160,000,000 Particles

The number of grains of dust that hang in the air of mines and shops have been counted. The greatest number of grains were breathed by jack-hammer drillers in talc mines. In every cubic foot of air around these men, there were 2,160,000,000 particles of dust. Anthracite coal miners breathed 232,000,000 particles of dust to a cubic foot of air. Cotton cloth weavers breathed 5,000,000 particles to the cubic foot.

The straight dustiness of the air, however, is not a guide to its degree of unhealthfulness. The dusty atmospheres that lead to lung troubles are especially those that are laden with particles of quartz. In the heavy air of the talc mine there is no quartz. The anthracite miner breathes one and one half per cent. of quartz in the dust around him. The cotton cloth weaver breathes none.

On the other hand, the laborers and mill operators in a quartz grinding plant breathe in air that is not nearly so heavy with dust as the coal mine or the talc mine, but it is 99 per cent. quartz. The tool finishers and drillers in a granite quarry breathe 35 per cent. of quartz.

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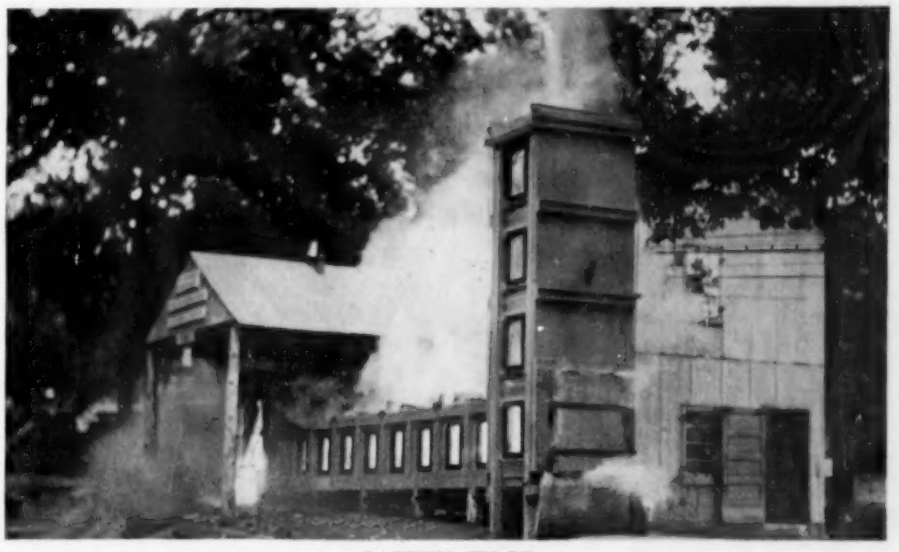

SAFETY FIRST

This explosion of grain dust in the Government's miniature factory went off with noise, flames, and smoke. But there was no flying glass from shattered windows, no damage to the little shop, the gallery or the tower. The plant had been adequately provided with safety vents which opened to carry out the flames and release pressure.

GEOGRAPHY

Copy of Columbus' Map Found in Constantinople

A COPY of a map made by Columbus in 1498, the original of which vanished long ago, has been found in a Constantinople museum. It is described by Prof. Paul Kahle of the University of Bonn, in the German scientific journal *Forschungen und Fortschritte*.

The copy appears as part of a large world map made by the Turkish geographer and navigator Piri Re'is, dated March, 1513. The lands of the Old World are derived from other early maps, but when it came to the newly discovered land across the Atlantic the Turkish cartographer depended entirely on Columbus. The islands are located as he described them, and the names on the towns and physiographic features are

those used by Columbus. This part of the map, moreover, is specifically ascribed by its maker to "Colonbo," which is a variant by only one letter from his original Italian name, "Colombo," the one-letter shift being due, perhaps, to the Spanish rendition, "Colon."

In an endeavor to account for a copy of Columbus' 1498 map being in the hands of the Turks, who were of course enemies of all Christendom at that time, Prof. Kahle has traced in Turkish records the fact that an uncle of Piri Re'is had owned a Spanish slave, captured with some Spanish ships in the western Mediterranean. This Spaniard claimed to have made several voyages with Columbus. Prof. Kahle thinks it not improbable that the Turks may have taken a copy of the 1498 map from the captured ship, and that this copy was in turn copied by Piri Re'is on his map of 1513.

One feature of the Re'is map may throw a little additional light on the still-disputed matter of Columbus' nationality. A group of islands is designated as "the islands of the eleven virgins"; and "eleven" is given in Italian, "undici," not in Spanish, "once."

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PSYCHIATRY

Suicide Increase Not All Due to Depression

THE INCREASE in the number of suicides in the United States cannot all be blamed on the depression, in the opinion of statisticians of the Metropolitan Life Insurance Co. While admitting that the depression has undoubtedly had its effect, they point out that the rise in the suicide rate started as early as 1925 and continued through the prosperous time in 1927, 1928, and part of 1929.

The most pronounced increase came between 1929 and 1930. The figures for the industrial policy holders of the company are still below what they were before the World War. During the war years there was a declining suicide rate, due to the fact that people were finding life a great adventure and had less desire to leave it.

The personality of the individual rather than external and environmental factors is considered important in leading to suicide. Therefore those who are concerned with reducing the number of suicides should train such individuals to become more stable. This is declared to be a community responsibility.

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PUBLIC HEALTH

Three-Fourths of Cancer Group Succumb in First Five Years

A SURVEY of 1,802 cancer patients treated in seven Philadelphia hospitals in 1923 found slightly more than one-tenth of the group alive six years later. If the patient is alive and well five years after treatment for cancer, the treatment is considered successful by cancer specialists.

Results of the Philadelphia survey, which was made by Dr. Arthur H. Estabrook of the American Society for the Control of Cancer, are made public by the *American Journal of Cancer*. Dr. Estabrook was able to secure information about approximately nine-tenths of the cases treated in seven general hospitals of Philadelphia in 1923. His survey showed these additional facts:

Nearly one-fifth of all patients admitted to the hospitals died in the hospital within a few months after treatment.

Of the 1,802 patients treated for cancer in 1923, 191 were alive six years later. Of these, in turn, 170 were in good condition, while 21 were in poor condition.

The group of patients suffering from skin cancer showed the highest proportion alive at the end of five years. The bone cancer group showed the next highest proportion of five-year survivors, and the other types of cancers showed the following order: cancer of the mouth, cancer of the breast and cancer of the womb.

Three-fourths of the entire group were known to be dead six years after treatment. A little over half of the total group, 957, died of cancer, within one year following treatment.

Nearly one-half of the group delayed one year before seeking treatment. Only a small number, 3.5 per cent. of the total, went for treatment within one month after noticing that something was wrong.

"The period of delay, without consideration of other factors in the life history of the cancer, seems to have little correlation with the end-result of treatment," Dr. Estabrook found.

Nearly a third of those alive delayed more than one year before receiving treatment. About one-fifth of those who died received the first treatment within three months of first noticing the condition. More than a third of those who died received treatment within six months following the first symptoms.

Treatment by X-ray or radium was used in 810 cases. Radiation combined with surgery was used in 653 cases, and surgery alone was used in 336 cases.

Conclusions could not be drawn as to the effectiveness of the methods of treament, Dr. Estabrook pointed out, because of insufficient data.

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METALLURGY

Indium Output May Soon Reach Ten Pounds a Year

INDIUM, metal so extremely rare that its price at present is ten times that of platinum, is becoming available in larger quantity. New ore sources have been discovered in America, and these, together with older known deposits in Germany, yield enough raw material to encourage expectations that the annual output of the finished metal, of 99.9 per cent. purity, will soon reach five kilograms, or a little over ten pounds.

Because it has hitherto been scarce almost to the point of unobtainability, the possible uses of indium are still practically unknown. But with ten pounds a year in sight, chemists are looking forward to researches on it.

One thing is known about indium at present: its salts are not poisonous to human beings. In this it differs from almost all of the other heavier metals. For this reason it may find important uses in medicine.

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BOTANY

Rare Plant Rediscovered In Western Texas Creek

ONE OF THE RAREST plant species in the world has been rediscovered in Madera Creek, in the Davis Mountains of western Texas, by Dr. R. A. Studhalter of Texas Technological College at Lubbock. Dr. Studhalter has reported his find to the *Scientific Monthly*.

The plant is known as *Riella*, and has

RARE RUFFLES

Drawing of a male specimen of the elusive "ruffle plant" which has been found in only two states.

been given the English name "ruffle plant," because of its peculiar structure. It consists of a slender stem an inch or so in length, with a thin transparent green wing growing out at one side and curling over its end. The graceful undulations in this green wing caused one American botanist to describe it as "a ruffle standing on end."

The plant has thus far been found in only two states, Texas and North Dakota. It grows only in sheltered canyons, either submerged in shallow water or just above water level. Since water in this western country is not always a certainty in any one place, the plant has been very elusive, disappearing from a known habitat and reappearing suddenly elsewhere.

Close relatives are known from the Old World, growing in the same type of habitat: sheltered shallow waters in semi-arid regions. Here also it is an extremely elusive plant.

The ruffle plant belongs to the moss family, and is a member of that subdivision of it known as the liverworts. However, because of its exceedingly peculiar structure and mode of reproduction, it is pretty much a creature apart even among its own botanical kindred.

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CHEMISTRY

Inert Krypton Gas Made To Combine With Chlorine

KRYPTON, one of the rare gases that form a small percentage of the air, has been forced into its first known chemical union by three physicists of the Chemical Institute at Bonn, Drs. A. von Antropoff, K. Weil and H. Frauenhof. This is rated as a scientific triumph, for the rare gases are all exceedingly inert chemically, and under ordinary circumstances do not unite with other elements at all. Only one of them, helium, now well known because of its use in airships, has been driven into chemical activity by several English physicists.

The Bonn experimenters produced what seems to be krypton chloride by a combination of low pressure, low temperature and electric discharge. They circulated krypton gas by means of a pump, keeping the pressure at approximately one to five per cent. of ordinary atmospheric pressure, and maintaining a low temperature with liquid air. As the gas was circulated through a glass tube it was subjected to an electric discharge, and at the same time chlorine gas was introduced.

The pressure within the tube fell, indicating a decrease in the number of the gas molecules present, and therefore the probable combination of the two elements to form a compound with a smaller number of larger molecules. At the same time a dark-red substance appeared, which the investigators take to be the krypton chloride compound.

A similar fall in pressure was recorded when bromine was used instead of its chemical relative chlorine, indicating the possibility of the formation of a second compound, krypton bromide.

"Control" experiments, in which one or the other of the conditions of the main experiment was omitted, or in which argon, another rare gas, was substituted for the krypton, yielded only negative results.

The Bonn experimenters have reported their preliminary results to *Die Naturwissenschaften*. They are continuing their researches, and expect to publish a detailed account in the near future.

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PSYCHOLOGY

Family History May be Useful Guide in Choosing Vocation

PARENTS should consider it their duty to keep a written record of the family history including the occupations of ancestors on both sides of the family and of all near relatives, and boys and girls should give consideration to this record in choosing their vocation, it is advised by Dr. v. Behr-Pinnow in a report to the *Deutsche Medizinische Wochenschrift*.

Musical ability is not the only vocational talent which may be handed down from generation to generation in a family, he points out. Special talent for teaching is also known to run in families. Dr. v. Behr-Pinnow has studied families in the old Bavarian town of Mittenwald which had long been devoted to violin making. The many different aptitudes required for this vocation were frequently handed on entire from father to son. Even those descendants who have left their native home cling to the making of instruments despite unfavorable prevailing conditions. Of course, some will go into entirely different lines of work, but the hereditary aptitude is likely to break through again and again.

In the choice of a vocation, the hereditary factor must be considered more than has been the case in the past, he concluded.

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PALEONTOLOGY

Fifty Million Years of Wild West

Smithsonian Publication on Ancient Mammals Stands as Monument to Dr. Gidley, Who Devoted Life to Their Study

By DR. FRANK THONE

See Front Cover

WHEN OLD-TIMERS speak of the "Old West"—with perhaps a misty, far-away look in their eyes—they mean the rampageous, hard-riding, free-shooting days when Buffalo Bill was young. Days when herds of bison and pronghorn were so vast that their numbers could not even be estimated, let alone counted; when a man's reputation as a mighty hunter depended not on a careful creeping up and a single shot but on how many buffalo he could shoot down in a half-hour's ride around a herd!

These days, they tell us sadly, are gone forever. The Old West was a very brief phase in American history, anyway: it was like a "nova" among the stars—a sudden flare into brilliant glory, followed by a rapid decline to extinction. The passing of the bison and the pronghorn was rapid and nearly complete simply because even uncountable herds of game could not stand up against the reckless mass slaughter that was visited on them during the eighties.

The old-timers often do not realize that the glory whose departure they mourn was foredoomed in its very origin. It was the product and the servant of the civilization that appeared to extinguish it. Buffalo Bill and his hunting companions and rivals were not killing their prodigious daily dozens of bison just for fun; they were hired by the railroad to get meat for the track-laying laborers. Their job, though more picturesque than that of white-aproned butchers, was just as utilitarian. And the railroad marched across the plain as inexorably as an ancient Roman road, and brought civilization as inevitably.

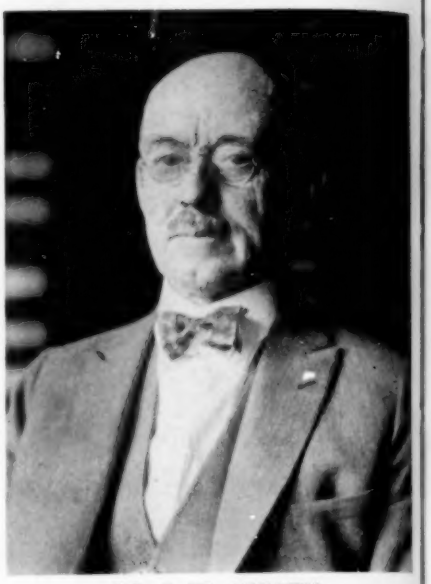
So the game herds of the West vanished, and the hunters' occupation was gone. They settled down to ranching, or bartending, or running for sheriff. Only their king kept a shadow of the old glory alive for a few years more, wandering the world with his great tented show. Now even that is gone.

The coming of civilization to the Plains, with its fringe of hard-riding, straight-shooting hunters brushing the population of native animals and native redmen aside as a plow-coulter turns wildflowers under to make room for wheat, really wrote "Finis" to a longer chapter of earth history than most of us stop to think about. For the Plains had belonged to the game animals for more than mere centuries; it had belonged to them for ages, for so many thousands of years that one can only say vaguely: maybe fifty or sixty millions, maybe more. Man's hustling domination of this continent is after all only the period at the end of a long geological sentence.

We hear a lot about the past fifty years in the West; not much about the preceding fifty million. Man is a talkative creature, who writes books and sets up monuments and demands attention generally. The animals only lived and died, and their monuments (few at best) are buried only where patience and understanding can find them out and decipher them.

A Modern Ezekiel

There died recently in Washington a scientist who had spent an active lifetime in recovering for us a record of this unknown Wild West of fifty million years ago. This man, Dr. J. W. Gidley, spent many sweltering summers at the dusty task of digging fossil bones out of solidified earth layers, and many long winters at the equally dry job of cleaning them, putting them together, and reading their scientific significance. But to him it was not a deadly occupation. In the midst of death he was in life. He had the vision of a modern Ezekiel, to clothe those dry bones with sinews, and with flesh, and with skin. And before he passed, he enlisted the aid of a skilled artist, E. Cheverlange, to put something of what he could see in those dry bones into a series of vivid sketches, showing the animals as they looked when the West was really wild. The pictures, and Dr. Gidley's descriptive text, are printed in a volume sponsored by the Smithsonian Institution.



DR. J. W. GIDLEY

As paleontologist of the U. S. National Museum, Dr. Gidley could see fossils as though they were still living animals.

Dr. Gidley's story of the strange beasts that once roved the West centers around the Bad Lands of South Dakota. This labyrinth of sun-baked canyons, which early French voyageurs called "mauvaises terres" because it was so easy to get lost there, is quite the opposite of "bad" to the fossil-hunting scientist. The small streams that carved the landscape into such fantastic shapes have given innumerable cross-sections down through the successive layers that represent ancient plains built one on top of the other—for the country round about was once as flat as western Nebraska is today. They have also made it possible for the collector to cut into the canyon-sides and with relatively little labor mine out the bones of the beasts that grazed there when the Bad Lands were Good Lands, ages ago.

The wide plain that has since been cut into the Bad Lands was built up layer by layer by downwashed material from the Black Hills to the west, when the Black Hills were tremendous mountains. Sometimes the floods that spread the gravel and earth laid down thick strata, sometimes thinner; the rivers that ran through the region were sometimes deep and swift, sometimes shallow and slow. But always there were great game

herds, and some of the animals left their carcasses in places where the bones were covered, deeper and deeper as the ages passed, until at last they were laid bare again by the cooperation of eroding streams and the scientist's pick and trowel.

Like a Chinese Book

In a formation like this, where the geology is normal and practically undisturbed, the record is read like a Chinese book, from the bottom page upward. The oldest bones are in the lowest strata.

Reading in this manner, Dr. Gidley traced the history of the rise and prosperity, decline and extinction, of numerous animal dynasties. Some of them are parts of the family trees of animals living still, though often in remote parts of the world. Others have vanished utterly, leaving no descendants either direct or collateral.

Notable among these are the titanotheres, whose name, Englished, means "titan-beasts." As restored to the flesh by the artist's pencil, a titanothere looks very much like a rhinoceros, except that it is much bigger, at least in some species, than any living rhinoceros. The most striking difference, superficially, is the arrangement of the two horns. The two-horned rhinoceroses now living have their horns in tandem, one in front of the other; but the titanotheres had their horns arranged as a pair, side by side at the end of the enormous snout. Moreover, these horns were set on bony projections protruding from the skull, like the horn cores of modern cattle and sheep, whereas true rhinoceroses have nothing of the kind, but wear their horns simply as a sort of highly specialized warts on the skin. There are other differences, too, in the structure and arrangement of the bones, that cause scientists to class titanotheres and rhinoceroses in quite separate groups.

But along with these great titan-beasts that looked like rhinoceroses and were not, there were real rhinoceroses that looked very little like their modern stocky, blocky kin of the African and East Indian jungles. They apparently had no horns, and they were long-legged and comparatively slender in build. Very probably they were graceful in movement and at least moderately fleet of foot. In general, their habits of life must have been more like those of present-day elk or wild horses than like those of the slow, stupid, dull-sighted, truculent modern rhinoceroses.

The artist has made a sketch of a dramatic scene involving one of these horse-like hornless rhinoceroses. It shows the poor animal attacked by a long-tailed saber-toothed tiger. The great cat is pictured as attacking much as a modern tiger or lion sometimes attacks; gripping a hard hold with its forelegs, slashing at its victim's vitals with raking strokes of its hindlegs, and at the same time sinking its tremendous eyeteeth into the base of the throat like daggers, seeking the heart or the great blood vessels.

What the saber-tooth left at the finish of his feast may have been cleaned up by another formidable flesh-eating beast, the hyaenodon, or "hyaena-tooth." This animal was wolf-like in general build, but bigger than a modern wolf and heavier-bodied. The hyaena-like dental equipment, however, suggests that it was a carrion-eater rather than a genuine beast of prey. And for all its wolf-like appearance, hyaenodon has no part in the ancestry of present-day wolves.

Little Wolves; Little Horses

There were, however, species of true wolves in the region as well, one about the size of a modern coyote; another a little creature only half as big.

Just as there were little wolves, so also were there little horses. The characteristic horse of the old pre-Bad Lands plain was the three-toed mesohippus, a larger animal and more evolved than the much-berhymed little eohippus; but still no larger than a big dog. Mesohippus apparently did most of his dry-land running on his middle toe, which has since become the only functional survivor of the original five in the modern horse; but the two shorter side toes, each with its separate hooflet, may have been useful on soft or wet ground. It is a strange thing that the horses, which originated and evolved in America, had died out completely when white men came, and were re-introduced by the Spaniards.

Dr. Gidley's account of the finding of his first mesohippus skeleton in the Bad Lands has a strong dash of drama in it. It was long enough ago so that the appearance of an Indian might mean trouble—and a feathered and moccasined Sioux did suddenly appear just as he had got the skeleton cleared of its overlying earth. But the brave only sat and watched with fascinated interest, and then, in a mixture of broken English and his own tongue proceeded to set forth his inferences about the "shunktanka cistilla," or "little horse"—and they would have done credit to a university man! Whereupon Dr Gidley purchased his porcupine-quill moccasins for a silver dollar, and the brave went his way, barefooted, enriched and happy.

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LITTLE THREE-TOED MESOHIPPUS

A horse no bigger than a good-sized dog that ramped and squealed on the western plains long ago.

SOCIOLOGY

Prevalence and Effectiveness Of Birth Control Studied

RECORDS of 2,000 women have now been analyzed in a careful statistical study of the prevalence and effectiveness of birth control practices at the present time in the American population, being made by Dr. Raymond Pearl of the Johns Hopkins University.

Dr. Pearl points out in his preliminary report in *Human Biology* that it is still too early to say to what extent birth control as actually practiced limits population growth. Some interesting facts, however, have already been brought out in the course of the study, which is supported by the Milbank Memorial Fund.

Results of the study suggest that women who practice birth control are innately more fertile than those who do not or than a random sample of women in general. Some attempt at birth control had been made by 35.8 per cent. of the white women studied and by 15.4 per cent. of the negro women. The methods of contraception actually practiced by the group of married white women made their pregnancy rate only about one-fifth less than that for women not practising birth control. In the case of the negro women, the pregnancy rate per 100 person-years' exposure to risk of pregnancy was actually higher among the ones practising contraception than among those not practising it.

The study is being made among women having their babies at hospitals in large cities east of the Mississippi River. While only 2,000 records have been studied so far, more than 19,000 have been collected, and the record taking will be continued until the end of this year.

Science News Letter, October 15, 1932

PHYSICS

Physical Basis Sought for Quantum Mechanics

A PHYSICAL BASIS for quantum mechanics is being sought by Prof. George Temple, young scientist who was recently appointed to the chair of mathematics at King's College, London.

Quantum mechanics has enabled physicists to calculate and explain many atomic happenings. Prof. Temple believes that it would be much more satisfactory if it were given a physical basis instead of resting entirely upon certain mathematical fictions, such as vectors and matrices.

"My aim," said Prof. Temple, "is to reformulate the principles of the quantum theory so that they represent a summary of experimental procedure, or experimental results having an immediate physical interpretation. The experimental processes which determine the state of a system together with the associated operations must form the starting point, rather than the state itself or the vector which represents it (a vector being an ordered set of numbers defining a state)."

By means of only two auxiliary hypotheses, first, that a system has a definite probability of changing from one state to another and, second, that this probability is the same in either direction, Prof. Temple deduces the fundamental equations of quantum mechanics.

During the last few years fundamental physical theory had been moving farther and farther away from physical basis. The new theory is a welcome indication that the pendulum has begun to swing in an opposite direction and that the foundations of subatomic physics may become once more understandable to the rank and file of physicists and possibly even to the general public.

Science News Letter, October 15, 1932

CHEMISTRY

Vitamin D Prepared In Concentrated Form

VITAMIN D, in the form of an extract of cod liver oil so potent that ten drops are of equal vitamin D value with three teaspoonfuls of standard cod liver oil, is now available to the medical profession. This natural vitamin D is not an irradiated product and not a cod liver oil concentrate, but an extract of the rickets-preventing principle of the oil. It is stated to be free from objectionable taste.

The new product was developed by Prof. Theodore F. Zucker of the College of Physicians and Surgeons at Columbia University, and the privilege of distributing it through regular medical channels has been licensed to the S. M. A. Corporation in Cleveland. This firm is already distributing the recently isolated primary vitamin A, and expects soon to have a combination of A and D to offer for medical use.

Science News Letter, October 15, 1932

IN SCIE

ROENTGENOLOGY

Insects' Internal Structure Revealed by X-Rays

X-RAY PHOTOGRAPHS of insects, believed to be the first ever made, have been taken at the Biological Laboratory at Cold Spring Harbor, N. Y., by Dr. Hugo Fricke and Irwin Sizer. They were made with a specially constructed X-ray tube, using small plates such as dentists use. The pictures show many scientifically interesting details of the internal structure of insects, and it is believed that this method can be used to advantage by students of insect life.

Science News Letter, October 15, 1932

PSYCHIATRY

Many Seek Hospitals As Shield From Depression

NO REAL INCREASE in mental disease has been observed as a result of the depression. Yet the number of patients admitted to Federal hospitals for mental disease in the last two years has increased strikingly. This is because a large group of men who have become victims of the severe economic conditions "have found in the generous legislation of the United States Government a staff upon which to lean in times of trouble," explains Dr. Douglas A. Thom of the Massachusetts Department of Mental Diseases.

"First admissions to all government hospitals increased nearly 30 per cent. in 1931 over 1930," Dr. Thom found.

About half of these first admissions were of patients suffering from both nervous and mental disorders. The increase in patients of this type admitted to government hospitals indicates, in Dr. Thom's opinion, that illness in itself may be a defense in time of trouble.

He found no comparable increase in admissions to state and other hospitals for mental disease from the civilian population, and no evidence that the depression has actually caused any appreciable increase in the amount of frank mental disease.

Science News Letter, October 15, 1932

FIELDS

ETHNOLOGY

Man Not Lord of Universe In Zuni Indian Code

THE NOTION widespread among human beings, that man is lord of the universe, has never been accepted among Zuni Indians of New Mexico, it appears from a study by Ruth I. Bunzel, just reported by the Bureau of American Ethnology, in Washington.

The Zuni Indian regards himself as equal in the world with the rabbit and the deer and the young corn plant, Miss Bunzel explains. The Indian hunter does not think he has a right to kill animals ruthlessly, even for food. So the deer is stalked ritualistically and killed in a prescribed manner, and when the carcass is brought into the house, it is received as an honored guest, so that the deer will not complain to its fellows.

To the Zuni, all objects have a spiritual essence. They are "living persons." The Zuni recognizes that houses and clothing and pots and pans lack human faculties. But he thinks of them as "raw persons," in contrast to man, who is classed as a "cooked person."

Science News Letter, October 15, 1932

ENTOMOLOGY

Stingless Bees of Panama Go to War for Oil

OIL, which causes great nations to arm themselves for war, is a promoter of conflict also among the strange stingless bees of Panama. So Herbert F. Schwartz of the American Museum of Natural History reports in the monthly journal *Natural History*.

The fondness of these stingless bees for lubricating oil had been noticed by two or three other naturalists on Barro Colorado Island in Gatun Lake, Mr. Schwartz reports. They raid spillings from oil cans, and hang around greasy engines to get it. They pack their hind legs with it, and when they get home they mix it with wax from their own bodies to build honeycomb cells.

The battle reported by Mr. Schwartz was first seen by Dr. Frank Lutz, a fellow entomologist in the American Museum. At first it seemed as though it might be a mating flight of the bees, but closer observation showed that the insects were all "neuter" workers, and that they were really fighting. They grappled like wrestlers and bit each other like bulldogs, rolling over and over on the ground as they fell.

The cause of the combat was not far to seek. The bees had found a hole under a box that served as a cover for a gasoline engine, and in passing in and out had come into collision. How the fight started the scientists were unable to discover; and after a short period of intense hostilities the bees themselves seemed to forget all about it, for they were seen afterwards going peacefully in and out, gathering their strange spoil.

Science News Letter, October 15, 1932

PALEONTOLOGY

Two Tons of Fossils Brought To Washington From West

GAME HERDS vaster than Buffalo Bill ever dreamed of, consisting of animals which no man ever saw, roamed the plains of the West some sixty million years ago. Such is the indication of over two tons of fossils which have been brought back to the U. S. National Museum in Washington by Charles W. Gilmore, at the end of a summer's digging in South Dakota and Wyoming.

Horse herds thundered over the plains in those remote days, but they were smaller than the mustangs of yesterday's romances, and had three hoofed toes on each foot instead of only one. There were tiny deer that live in the Old World today. There were enormous wild pigs, with skulls a foot and a half long, their jaws set with huge teeth.

The most abundant of the fossils found by Mr. Gilmore were those of oreodonts, a family of mammals that became extinct without leaving any near relatives. They were about the size of small pigs, but had teeth more like those of cud-chewing animals. Apparently they were social beasts, living in herds along the streams.

With all this wealth of herbivorous game, naturally there were beasts of prey. Wild dogs abounded, as wolves and coyotes did a few years ago in the West. But the most terrible of the killers was a species of saber-tooth tiger, as big as a large lion, its jaws armed with slashing dagger-like upper eyeteeth six inches long.

Science News Letter, October 15, 1932

PUBLIC HEALTH

Typhus Fever Attacks Scientist Who Studied It

RACKED by typhus fever, Dr. R. E. Dyer, 46, of the U. S. Public Health Service is lying ill at the U. S. Naval Hospital in Washington, a victim to the disease which he has been investigating for the last two and one-half years.

Working in the laboratories of the U. S. National Institute of Health, Dr. Dyer discovered that the American variety of typhus fever, from which he now suffers, is carried by fleas and not by the body louse which transmits the European variety. He has lately been working on a vaccine to give protection against the disease. The vaccine has been successful in protecting guinea pigs, but has not yet reached the stage of human application, so unfortunately Dr. Dyer himself did not have any benefit from it. Public Health officials believe that Dr. Dyer was working with a particularly virulent strain of germs or of infected fleas when he was accidentally infected.

American typhus fever has a relatively low mortality rate, and Dr. Dyer is expected to recover, but he will probably spend at least two uncomfortable weeks fighting the disease. He was taken ill October 1, but at first was thought to be suffering from influenza.

Dr. E. T. Ceder, one of Dr. Dyer's asistants in the typhus fever investigations, suffered an attack of the disease last year. Dr. Dyer was also one of the men who found that some cases of typhus fever reported in eastern United States were in reality cases of Rocky Mountain spotted fever.

Science News Letter, October 15, 1932

SEISMOLOGY

Nicaraguan Earthquake Centered off Coast

THE CENTRAL American earthquake of Saturday, Oct. 1, had its epicenter somewhat to the south of the oftenshaken city of Managua, scientists of the U. S. Coast and Geodetic Survey stated after examining data collected from seven seismological observatories by Science Service. The point of greatest disturbance was just a little off the coast, in latitude approximately eleven degrees north, longitude eighty-six degrees west. Time of origin was 9:59.1 p. m., eastern standard time.

Science News Letter, October 15, 1932

MEDICINE-PHARMACOLOGY

Quinine from Peruvian Bark

"A Classic of Science"

Isolation of the Bitter, Astringent Principle Which Is So Valuable in Treating Malaria and Other Fevers

RECHERCHES CHIMIQUES SUR LES QUINQUINAS (Chemical Researches on the Cinchonas). By MM. Pelletier and Caventou. Read before the Academie des Sciences September 11, 1820. Published in Annales de Chimie et de Physique (Gay-Lussac and Arago), Vol. XV. Paris, 1820. Translated for the SCIENCE NEWS LETTER *by Helen M. Davis.*

AT EVERY EPOCH of those great discoveries which have extended the sphere of science, chemists have thought that they ought to take up again some of the work of their predecessors; guided by new light, they have often arrived at results which had escaped distinguished scientists who lived under less advantageous circumstances.

The cinchonas take their place at the head of those substances which are thus periodically subjected to new investigation: it would, in fact, be difficult to enumerate the researches undertaken upon these barks, from Bucquet to those with which M. Lauber has enriched science. But we must be allowed to recall the great dissertation of Fourcroy, which was long a model of organic analysis. We must cite also the analysis of eighteen species of cinchona, undertaken by M. Vauquelin, a project remarkable for its scope and for its results, since, in that Memoir, M. Vauquelin enriched organic chemistry with a new acid, gave the sure characteristics by which the true febrifuge cinchonas can be recognized, and gave chemists a new method of analysis. We should also recall a memoir by M. Reuss of Moscow, if the work of M. Gomès of Lisbon did not claim all our attention: it is to this last chemist that we owe the discovery of a special principle in cinchona, a principle which we have recognized as a salifiable organic base, the study of which will be one of the chief objects of our memoir.

Now, if we should be asked to give the reasons which have induced us to work with the cinchonas after such worthy chemists, we should avow the following considerations which have presented themselves to us. The discovery of organic bases marked an epoch in science; they explain a set of anomalies which are met with in organic analysis. The salifiable organic bases have such special properties, they are so constantly the active material of the organic compounds which contain them, that it was natural to search for them in the cinchonas: besides, if cinchonine, discovered by M. Gomès in gray cinchona, is, as that physician asserts, the substance by virtue of which the bark acts upon the animal organism, although that scientist assures us that it is neither acid nor alkaline, was it not necessary to find out whether there were not some error in the last part of its preparation? These are the reflections which suggested to us the idea of undertaking new researches upon the cinchonas: once entered upon this project, we have pushed the work beyond the goal which we at first set for ourselves. The properties which we found in cinchonine are so related to those of the other substances which accompany it that we have not been able to avoid studying these substances in their entirety.

Having examined several species of cinchona, we shall find in the statement of the species the titles of the sections which should divide this memoir; the particular account of the different principles which they contain will be set forth in the several chapters. We shall first take up the chemical analysis of gray cinchona (*Kina laxa, Cinchona condaminea*), generally regarded as the type of the various barks. . . .

Gray Cinchona

This is the method which we first thought should be employed to give us cinchonine in the state of purity.

We heated 2 kilograms of crushed gray cinchona with 6 kilograms of strong alcohol; we repeated this operation four times; the alcoholic tinctures were combined and distilled to remove all the alcohol. We took care to add 2 kilograms of distilled water, in order that the material dissolved in the alcohol would be protected from the direct action of the heat after the separation of the alcohol. This material, received upon a filler which allowed the aqueous liquor to pass through, was of a reddish color and a resinous appearance; in this state it was washed upon the same filter, with water slightly alkalinized with potassium hydroxide. The liquor which had passed through the filter served for the first wash water, after having been first alkalinized; after washing for several days, the alkaline liquors passing through the filter limpid and colorless, the material remaining upon the filter was washed with a considerable amount of distilled water; it was then a greenish white, very fusible, soluble in alcohol, and forming crystals: it was the cinchonin of Dr. Gomès; it had, in this state, some characteristics of resinous substances; but, upon dissolving it in acid much diluted with water, it lost a considerable quantity of fatty material of a green color which had all the properties of the fatty green material obtained for the first time by M. Lauber, in treating cinchona immediately with sulphuric ether. We note here that if too concentrated an acid is employed, a large quantity of fatty material remains in solution in the liquor, and the cinchonin which is afterward obtained is contaminated with it.

East of the Stoney Mountains

the geology of North America was studied by William Maclure in 1823. His work foreshadows many later discoveries of the work of water and ice in forming this continent. It will appear in the next issue as

THE NEXT CLASSIC OF SCIENCE

The acid liquor (we used hydrochloric acid) was a golden yellow. Evaporated, it gave crystals soluble in alcohol and in water. Its taste was very bitter; it was abundantly precipitated by alkaline solutions, the gallates, the alkaline oxalates giving precipitates soluble in alcohol, etc. Without stopping longer over its properties, which we cannot explain at the moment, we treated the solution with very pure magnesia and with the aid of slight heat: the mixture was then thrown on a filter after it was quite cold, and the magnesia precipitate was washed with water. The first wash waters were yellow; they end by being colorless. The magnesium precipitate, sufficiently washed and dried on the water-bath, was treated three times with alcohol at 40°. The alcoholic liquors, very bitter, slightly yellow, gave, upon evaporation, crystals in needles of a dirty white. These crystals, redissolved in alcohol, and allowed to crystallize again, gave a crystalline material very white and brilliant. We may also obtain very white crystals by washing them in the cold with a little sulphuric ether. These crystals are pure cinchonine.

To preserve harmony in the nomenclature, it will be necessary to change the name *cinchonin* to *cinchonine*, since the salifiable organic bases already known have names of this sort: out of respect for the rights of M. Gomès, we did not make this change at the time of the reading of our memoir before the Academy; but MM. Vauquelin, Thenard and Déyeux, commissioners of that society, have passed upon this consideration.

Cinchonine

The cinchonine obtained by gentle evaporation of the alcoholic solution, appears as slender prismatic needles, of which the crystalline form cannot be determined. Upon very rapid evaporation, it appears in translucent crystalline white plates, refracting light.

Cinchonine is very slightly soluble in water; it requires two thousand five hundred parts of boiling water to dissolve it: upon cooling, the liquor becomes slightly opaline, thus proving that cinchonine is even less soluble in the cold.

Cinchonine has a particularly bitter taste; but this taste is long in developing, and has little intensity by reason of the insolubility of this substance; it appears in cinchonine rendered soluble by union which acids; it is then very bitter, styptic and persistent, on the whole similar to that of a strong decoction of cinchona, except that it is less astringent, the astringence of cinchona being due especially to another principle. Cinchonine, exposed to the air, is not changed: except that after a time, it absorbs carbon dioxide, and when it is dissolved in an acid solution, it produces a gentle effervescence.

Exposed to the action of heat in closed vessels, it does not melt before beginning to decompose. The products which it gives by distillation over the naked flame are those usually produced by organic matter not containing nitrogen: distilled with oxide of copper in a convenient apparatus, it forms only water and carbon dioxide. It is therefore composed of oxygen, hydrogen and carbon in certain proportions, and nitrogen does not enter into its composition: burned with ammonium nitrate, it leaves only a trace of mineral material, akaline or earthy.

Cinchonine is very soluble in alcohol, especially with the aid of heat; an alcoholic solution, saturated at the boiling temperature, crystallizes upon cooling; alcoholic solutions of cinchonine are very bitter, which proves again that the slight bitterness of pure cinchonine is due to its insolubility.

Cinchonine dissolves in ether: but it is much less soluble in it than in alcohol, especially in the cold; it dissolves also, although in very small quantities, in fixed or volatile oils, especially in oil of terpentine. These solutions are bitter. Oil of terpentine, saturated with cinchonine at an elevated temperature, gives up a great part in crystalline form, upon cooling: it is not thrown out of solution in fixed oils.

We shall now consider cinchonine from the point of view of its alkalinity which we have recognized. Cinchonine restores to blue litmus turned red by acid; it combines with all the acids, and is able to form neutral combinations which do not affect litmus, with the stronger mineral acids. These combinations show different properties, and have constant proportions.

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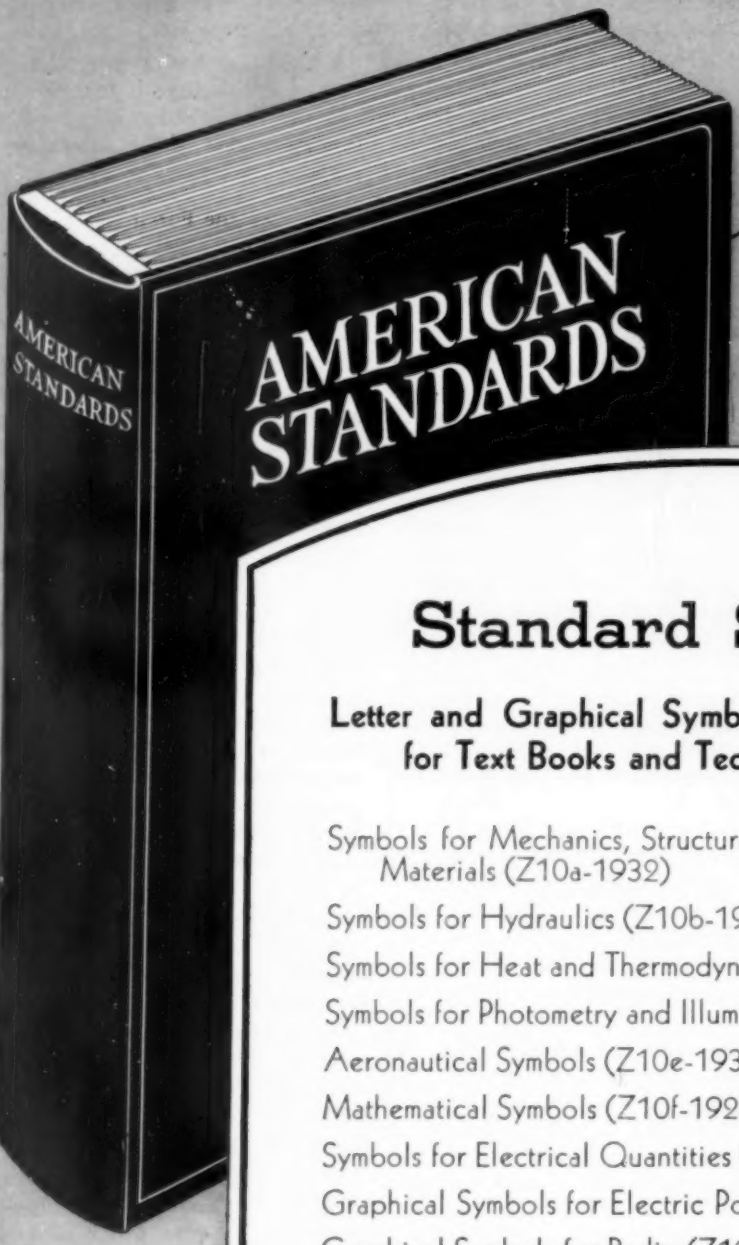

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PHYSICS

Scientist Directs Huge Magnet In Attack to Smash Atom

SMASHING the atom is a favorite laboratory occupation these days, when physicists are energetically attacking the hearts of atoms to discover their secrets. The intentional disintegration of atoms is not a new achievement in science, for Lord Ernest Rutherford knocked H out of light chemical elements in 1919. The H in this case stands for the element hydrogen. Rutherford used fast-flying helium atom hearts, called alpha particles, for his bombarding projectiles. These came from naturally disintegrating radioactive substances, like radium.

The projectiles emitted from the atom in Rutherford's early smashing were the hearts of hydrogen atoms, called protons, which carry most of the mass of the atom. Protons in their turn are now being used as bullets with which to bombard other elements.

Artificial Radioactivity

In Cambridge's famous Cavendish Laboratory, which is presided over by Lord Rutherford, J. D. Cockcroft and E. T. S. Walton, gave protons a push of 125,000 and more electron-volts and aimed them at lithium metal. Some of the atomic nuclei were disrupted. A lithium heart, weight seven, combined with a proton, weight one, to give two alpha particles or helium nuclei, each of weight four.

More exciting was the discovery that the smashing of the lithium heart starts a sort of explosion within the atom which causes it to give off more energy than is fired into it. This is artificial radioactivity. The physicists can write a balance sheet or formula for the reaction and this is an important step in the chemistry of the interior of the atomic nucleus. It promises to lead to more accurate knowledge and theory of how the stars are stoked and how matter can be changed into energy.

Whirls Protons

Prof. E. O. Lawrence of the University of California has a unique method of whirling protons in magnetic fields until they acquire high energies. He can produce atomic particles with an energy of 3,600,000 electron volts. The apparatus that is used contains one of the world's largest electromagnets.

With these atom smashing machines working at a fraction of their abilities, Prof. Lawrence has confirmed the Cavendish Laboratory work on lithium.

Nature provides atomic bullets with energy far exceeding those that can be energized in the laboratory. These are the cosmic rays themselves or the particles that fly off when cosmic radiation smashes into earthly gases and solids. With the use of such projectiles at the California Institute of Technology, the existence of a positive particle of as little mass as an ordinary electron seems to have been demonstrated within the last month. (*SNL, Sept.* 24, 1932, *p.* 197; *Oct.* 8, *p.* 223) This positive electron promises to do its constructive smashing of present atomic theory.

Science News Letter, October 15, 1932

ENGINEERING

Life Expectancies For Machinery Worked Out

AFTER MORE than fifteen years of research, scientists connected with the Iowa Engineering Experiment Station have succeeded in establishing mathematical laws describing the mortality data for many kinds of physical property, according to Prof. Edwin B. Kurtz, head of the department of electrical engineering at the University of Iowa, and Robley Winfrey, editor on the Experiment Station staff. Assisted by Prof. G. W. Snedecor and Prof. A. E. Brandt of the department of mathematics at the Iowa State College of Agriculture and Mechanic Arts, these men have announced results of research on life characteristics of physical property which will permit engineering valuations and depreciation allowances for some industrial equipment to be made with accuracy hitherto unattainable.

Just as life insurance actuaries make mass studies of human mortality records, so are the cooperating Iowa professors making mass studies of the service lives of such physical equipment as passenger automobiles, waterworks pumps, incandescent lamps, crossties, disc harrows, and freight cars.

Among the records studied by Prof. Kurtz and his fellows in their investigations of machine mortality are data extracted from public utility valuation reports, publications of such organizations as the American Waterworks Association, the Illuminating Engineers' Society, and the Forest Products Laboratories, and reports of the North German and Prussian telegraph systems as far back as 1852.

Mathematical equations descriptive of thirteen type mortality curves have been obtained for sixty-five separate property groups in such industries as water supply, telephone and telegraph, electric service, steam and electric railway, motor vehicle, and agricultural implement. These mortality studies are not restricted to "death" rates alone in the service lives of the equipment units involved.

Such tables as the Iowa professors have prepared could be employed in the determination of proper premium rates for "life" insurance policies on the effective working lives of industrial equipment of all kinds, under methods altogether comparable to those used by human-life insurance companies. However, it is to engineering and business planning rather than to "life" insurance that the investigations of Prof. Kurtz and his colleagues will chiefly contribute. The equations, graphs, and tables resulting from their mortality studies will give cost accountants more accurate estimates of depreciation than have previously been possible.

Science News Letter, October 15, 1932

RADIO

The Science Service radio address next week will be on the subject,

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MEDICINE

Whooping Cough May Have Dual Personality

WHOOPING COUGH may have a dual personality. One-half of it may be the head cold infection with which it starts, and which may be caused by a germ of the filtrable virus type, so far unrecognized. The other part of its dual personality may be the cough stage, with whoop and other characteristic symptoms, which is probably caused by the whooping cough bacillus itself, known to scientists under several names.

The suggestion that the cold stage and the cough stage are separate and each caused by a different germ has been reached, in the course of investigations with chimpanzees, by Drs. Arnold R. Rich, Perrin H. Long, J. Howard Brown, L. Emmett Holt, Jr., and Eleanor A. Bliss of the Johns Hopkins Medical School. In their report to *Science*, the investigators state that further studies are being made in the hope of clearing up the situation.

Some of the chimpanzees had their throats sprayed with filtrates of sputum from early human cases of the diseases. These apes developed infections like common colds, but no coughs. Other chimpanzees got the whole sputum. One of these developed the cold-like infection first, and thirty days later, a second "cold" followed in two days by typical whooping cough. Other apes showed similar reaction when inoculated with whooping cough bacillus.

One other interpretation suggested by the investigators is that the cold infections were not part of the whooping cough at all, but were really common colds, acquired because the human cases of whooping cough from which the material was taken also were carriers of the common cold.

Science News Letter, October 15, 1932

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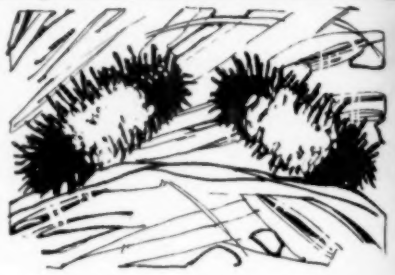
ENTOMOLOGY

NATURE RAMBLINGS *by Frank Thone*



Woolly Bears

ON WARM autumn days you will find them, humpity-crawling across the sidewalks, as though they were in a great hurry to get somewhere —very bristly caterpillars, black fore and aft with a broad band of red about their middles. Most other caterpillars have long since spun themselves into cocoons against the coming of winter, but these hustling little fellows seem to be indifferent to that threat and linger on without building their silken cabins.

The woolly bear caterpillar is an exception to the usual caterpillar rule of housing snugly through the winter and coming out in the spring as a butterfly or moth. Like his giant namesake among the warm-blooded animals, the woolly bear hibernates; seeks out a sheltered crack or corner somewhere and waits out the winter in a comatose condition. On warm days he is apt to rouse out of his sleep, and sometimes a prolonged thaw in January or February will bring him out in force. After the winter is over he continues his migration and feeding for some weeks before spinning in with a thin and careless coccoon.

Why the "woolly" part of his cognomen it is hard to guess. There is nothing curly about his covering; it is all straight, stiff bristles. And aside from his hibernating habit there is little to suggest a bear. Perhaps rather a porcupine, for if you touch him he instantly curls himself up head-to-tail, with his formidable armature bristling out in all directions. And those bristles do not depend merely on their strength and sharpness; they are often poisonous, even to the relatively tough human skin. They must be manifoldly formidable to enemies more nearly his own size.

Science News Letter, October 15, 1932

BACTERIOLOGY

Bacteria Made to Change Forms by Change of Food

BACTERIA are made to live not merely a double life but a triple one, in the laboratory of Miss Agnes Quirk of the U. S. Department of Agriculture. By suitable modifications of their diet, she can at will make them visible or invisible, and she can make the visible forms develop two different kinds of colonies, on the solid nutrient media that constitute their food.

There is a certain parallelism between Miss Quirk's work and that of Dr. Arthur I. Kendall of Northwestern University Medical School in Chicago. Last summer Dr. Kendall announced his ability to make bacteria visible or invisible at will, using a special protein medium which he had developed. Miss Quirk controls the life forms of her bacteria without using an unusual type of food, but by controlling the acidity and alkalinity of the ordinary beef infusion broth and agar.

The bacteria which Miss Quirk was studying had a habit of forming spots or "colonies" of two different types, when cultivated in the laboratory. One colony type was smooth-surfaced, the other rough. Bacteriologists never knew why they did that. Miss Quirk found that she could produce either type at will from the same original stock, getting 100 per cent. "smooth" colonies on a poured agar plate when she left the culture medium chemically neutral, and 100 per cent. "rough" colonies when she made it acid.

She discovered further that the germs in "smooth" colonies are virulent and active, whereas those in "rough" colonies are less able to cause disease. She can convert either form into the other at will, merely by changing the acidity and physical state of its food.

The germs in both "smooth" and "rough" colonies are visible under the microscope; but Miss Quirk has found that at a certain stage of the growth of the smooth type organism, it can produce a filterable form, which can be induced to pass through the pores of a close-grained porcelain cylinder, and, after a period of time, be developed again into the microscopically visible form, retaining the characteristic virulence and behavior of the parent strain.

The bacteria used by Miss Quirk in her filtration experiments were those of two plant diseases; potato black rot and plant tumor.

The method for causing bacteria to produce at will, "smooth" and "rough" colony forms in pure plate culture, has been applied by Miss Quirk to thirteen plant pathogens and by Major James S. Simmons of Walter Reed Hospital to the Rawlin's strain of typhoid with success. The "smooth" and "rough" typhoid organisms were not tested for their pathogenic or antigenic properties.

It is believed that the technique for causing bacteria to assume a dual existence is applicable to many, if not all parasitic bacteria.

Miss Quirk believes that the invisible or filterable stage of the organism is reached during the transformation period of the smooth form to the rough form and that conditions can be imposed upon the organism to produce a filter-stage or invisible state and later be returned to the visible state.

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METEOROLOGY

Mt. Washington Station Begins Work for Winter

A WEATHER station on Mount Washington, N. H., which has the reputation of being the windiest spot outside of the "Home of the Blizzard" in the Antarctic, was opened to record the gales, blizzards and quieter moods of the weather on this highest point in New England. Already the snows have begun, and there is no prospect that the observers will lead an easy life.

The party that is attempting this arduous task is up there for the fun of it, but not simply to live there through the winter, though this in itself will be quite a trick. They will undertake to maintain a first order station and send out twice daily radio reports. They will also make many experiments in radio transmission.

In charge is Joseph B. Dodge, of the Appalachian Mountain Club, who has his home at Pinkham Notch at the base of Tuckerman Ravine. He will be a frequent visitor to the station on the summit, and will maintain a fully equipped weather station at the base. The base station should provide many interesting comparisons of wind and temperature with the top. Those who will live on the summit are seasoned mountaineers. R. S. Monahan spent several weeks on Alaska's icy mountains this summer with Bradford Washburn's Mt. Fayerweather party. Alexander A. Mackenzie, radio enthusiast, has been hutmastering at Pinkham Notch for the Appalachian Mountain Club. S. Pagliuca, electrical engineer, is thoroughly familiar with the White Mountains, and last summer was in charge of the Galehead Hut of the Appalachian Mountain Club system.

To obtain a weather record on a wind-swept summit is not easy, and for wind velocity and snowfall usually difficult. Anemometers will go round so long as they are not covered with ice. But how is an anemometer to be kept clear when the wind is building frostwork from cloud particles at a rate of one to six feet in a single night? The answer will probably be found in a heated anemometer, which the Blue Hill Observatory is constructing.

Snow falls so slowly that strong winds drive the flakes almost parallel to the surface of a mountain, up one side, across the top and down the other. Therefore, a cylindrical gauge with the usual horizontal receiver may catch only a little that may swirl into it. The rest is dumped into one of the ravines. Shielded gauges, with receivers parallel to the mountain slopes, will be constructed out of furnace piping and placed at various points on and around the summit.

To the summit of Mount Washington, altitude 6,288 feet, there have been transported in addition to instruments, coal, food and other material, ten cylinders of hydrogen weighing 1300 pounds that will be used during the winter to inflate 225 meteorological sounding balloons.

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If the prevailing winds of the eastern United States were to reverse themselves, the climate would become semi-tropical and rainfall would be very heavy.

Cucumbers were grown for the Roman Emperor Tiberius all the year round, by means of "frames" on wheels which were rolled into buildings for protection against cold and frost.

• First Glances at New Books

Education

FROM HOMER TO HELEN KELLER, A SOCIAL AND EDUCATIONAL STUDY OF THE BLIND—Richard Slayton French—*American Foundation for the Blind, Inc.*, 208 p., $2.25. In this absorbing book, the author gives a vivid picture of the blind from ancient to modern times, and describes and criticizes the various efforts to help them. A large part of the book is devoted to the education of the blind and should be read by all who have any connection with or interest in them, whether as professional or amateur assistants, as relatives or as benefactors.

Science News Letter, October 15, 1932

Physiology

EXERCISE AND ITS PHYSIOLOGY—Adrian Gordon Gould and Joseph A. Dye—*Barnes*, 484 p., $3. While designed as a text for students of physical education and physiology, this book is not too technical to be read by the intelligent layman who is interested in the subject. A list of questions and a bibliography concludes each chapter. Numerous illustrations help to clarify the subject.

Science News Letter, October 15, 1932

Medicine

HANDBOOK OF TROPICAL FEVERS—N. P. Jewell and W. H. Kauntze—*Wood*, 484 p., $6. Dr. A. T. Stanton, chief medical advisor to the Secretary of State for the Colonies, has written a foreword. The book is clear and concise and should be helpful to medical students and all physicians who come in contact with tropical diseases, either in the tropics or among patients returned home from there. Not meant for the lay reader.

Science News Letter, October 15, 1932

Ceramics

SPECIFICATIONS AND METHODS OF TEST FOR REFRACTORY MATERIALS AND MANUAL FOR INTERPRETATION OF REFRACTORY TEST DATA—*American Society for Testing Materials*, 93 p., 50c. A reprint from the society's proceedings.

Science News Letter, October 15, 1932

Medicine-Economics

NURSING SERVICES AND INSURANCE FOR MEDICAL CARE IN BRATTLEBORO, VERMONT—Allen Peebles and Valeria McDermott—*Univ. of Chicago Press*, 65 p., 60c. This publication of the Committee on the Costs of Medical Care is a study of the activities of the Thomas Thompson Trust, which was designed to give relief and support to poor or sick women in Brattleboro, Vt., and in Rhinebeck, N. Y. An evaluation of the nursing program is given by Violet H. Hodgson and Katherine Tucker, of the National Organization for Public Health Nursing. The entire study contains much to interest those who are concerned with supplying nursing care to residents of industrial towns.

Science News Letter, October 15, 1932

Horology

THE LURE OF THE CLOCK—D. W. Hering—*New York Univ. Press.* xiv+121 p., 12 pl., $4. This book is primarily a detailed description of the James Arthur collection of clocks and watches, but because of the genuinely scholarly interest of the collector, it almost automatically becomes a history of horology as well. In addition to the plates, there are many full-page halftone illustrations.

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Psychology

THE PSYCHOLOGICAL EXCHANGE—Edited by James Hargan and Norman Powell—*The Psychological Exchange*, $3 per year. A bi-monthly publication containing news of individual psychologists and of the research programs under way at the universities and other institutions. New books are listed with complete tables of contents but are not reviewed. Will be of great value to anyone wishing to keep in touch with this profession.

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Medicine-Economics

THE MEDICAL SERVICE OF THE HOMESTAKE MINING COMPANY—Louis S. Reed—*Univ. of Chicago Press*, 54 p., 60c. A publication of the Committee on the Costs of Medical Care. Dr. Reed has surveyed the medical service offered free to the employees of the Homestake Mining Company. He finds on the whole that the arrangement is satisfactory to patients, physicians and company.

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Engineering

SYMPOSIUM ON THE EFFECT OF TEMPERATURE ON THE PROPERTIES OF METALS—*American Society of Mechanical Engineers* and *American Society for Testing Materials*—829 p., $6. If metals, with which engineers build the world's machines, should suddenly become able to withstand better the effects of high temperatures, man would soon be relieved of more of the world's physical labor by superior alloys. This is a problem on which a large part of today's research is directed. An excellent summary of its achievements is contained in this volume, which reports the second symposium on the subject to be held in this country. Unusually long discussions add to the interest and value of the book's twenty-seven papers.

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Astronomy-Physics

BUILDERS OF THE UNIVERSE—Foreword by Albert Einstein—*U. S. Library Association*, 96 p., 25c. Extracts from the Bible, and the original writings of Copernicus, Tycho Brahe, Kepler, Galilei, Newton and Einstein.

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Home Economics

HOUSEHOLD MANAGEMENT AND KITCHENS—Edited by John M. Gries and James Ford—*President's Conference on Home Building and Home Ownership*, 228 p., $1.15. Data presented in these conference committee reports are most likely to be useful to architects, builders, and home economists. However, the statistically minded housewife or her husband may also profitably study the charts and diagrams, such as charts of time expenditures and plans of kitchens, and may thereby find ways to increase household efficiency.

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Television

THE OUTLOOK FOR TELEVISION—Orrin E. Dunlap, Jr. *Harper*, 297 p., $4. A comprehensive, readable and authoritative story of the research which eventually will bring television to a practical state.

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